1. Define the following vocabulary terms in the vocab section of the packet: *electron, proton, neutron, nucleus, atomic number, atomic mass, and isotope.*
2. How is Rutherford’s model of the atom different from that of Thomson?

Rutherford’s model positioned the positive charge in the center of the atom (nucleus), whereas the positive charge in Thomson’s model was spread throughout the atom. In Thomson’s model the electrons were also spread throughout the atom. Rutherford’s model positioned electrons outside of the nucleus.

1. Why did Rutherford conclude that an atom’s nucleus has a positive charge instead of a negative charge? Summarize the conclusions that Rutherford’s team made about the structure of an atom.

When Rutherford shot positively charged particles at gold atoms in gold foil, most of the particles went straight through the foil while some particles were deflected (bounced off) at angles. He proposed that the particles were hitting a dense positively charged center of an atom because like charges repel each other.

1. The isotope of carbon that is used to date prehistoric fossils contains six protons and eight neutrons. What is the atomic number of this isotope? How many electrons does it have? What is its mass number?

Atomic # = 6, electrons = 6, mass number = 14 (6p + 8n)

1. Fill in the following table:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Element | Symbol | # of Protons | # of Electrons | # of Neutrons | Mass Number |
| Magnesium | Mg | 12 | 12 | 12 | 24 |
| Polonium | Po | 84 | 84 | 41 | 125 |
| Iron | Fe | 26 | 26 | 30 | 56 |

1. The element copper has naturally occurring isotopes with mass numbers of 63 and 65.

The relative abundance and atomic masses are 69.2% for a mass of 62.93amu and 30.8% for a mass of 64.93amu. Calculate the average atomic mass of copper.

0.692 x 62.93 = 43.54756

+

0.308 x 64.93 = 19.99844

63.564amu

1. There are three isotopes of silicon. They have mass numbers of 28, 29 and 30. The average atomic mass of silicon is 28.086amu. What does this say about the relative abundances of the three isotopes?

The most abundant isotope is Si-28 because the mass of the element silicon is very close to 28. Si-29 and Si-30 only contribute a small amount of mass to the element.